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Mark Watson — Mark Watson
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Application No.	:	**09/970,144**
Confirmation No.	:	**2134**
Applicant	:	**HERLEY, Cormac**
Title	:	**TEXT DOCUMENT CAPTURE WITH JITTERED DIGITAL CAMERA**
Filed	:	**October 3, 2001**
TC/A.U.	:	**2621**
Examiner	:	**LAVIN, Christopher L.**
Docket No.	:	**MCS-027-04 (183200.01)**
Customer No.	:	**27662**

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APPEAL BRIEF UNDER 37 CFR 41.37

I. REAL PARTY IN INTEREST

The subject application is assigned to Microsoft Corporation, of Redmond Washington.

II. RELATED APPEALS AND INTERFERENCES

There are no known related appeals or interferences.

III. STATUS OF CLAIMS

1. Claims 1-8, 11-20, 22-29 and 31-33 represent all claims currently pending in the application.
2. Claims 1-8, 11-20, 22-29 and 31-33 are rejected.
3. The rejection of claims 1-8, 11-20, 22-29 and 31-33 is hereby appealed.

IV. STATUS OF AMENDMENTS

No amendments are currently pending.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The pending patent application includes four independent claims: claims 1, 13, 25, and 33. A summary of the subject matter claimed in each independent claim is provided below. In addition, a summary of claim 20 is also provided below, as the Examiner has separately rejected claim 20 under 35 U.S.C. §112.

a. Subject Matter of Independent Claim 1:

In general, the subject matter of claim 1 relates to a method for capturing and digitizing a text document in a manner that provides an enhanced resolution digital representation of the original text document.

In particular, as illustrated by FIG. 2, the claimed method provides a jitter control device 78 which imparts a continuous lateral jittering between a digital imaging device 54 and the text document 56. The digital imaging device 54 then obtains multiple laterally-

displaced digital images of the text document 56 during the continuous lateral jittering of the digital imaging device. Next, as illustrated by FIG. 5, the claimed method automatically determines fractional pixel offset positions at which each digital image was obtained. An enhanced resolution representation of the original text document is then generated from the multiple laterally displaced images as a function of the computed fractional pixel offset positions as illustrated by FIG. 6. Finally, as illustrated by thresholds T_{w1} and T_{b1} in FIG. 8, the claimed method acts to de-blur the enhanced resolution representation of the text document by thresholding the enhanced resolution representation of the text document into either one of two pixel luminance levels, representing foreground and background pixels, with the foreground pixels corresponding to text in the text document.

b. Subject Matter of Independent Claim 13:

In general, the subject matter of claim 13 relates to a system for capturing and digitizing a segment of a printed copy of a text document, with the claimed system acting to provide an enhanced resolution copy of the original text document.

In particular, as illustrated by FIG. 2, a jitter control device 78 imparts a continuous lateral jittering between a digital imaging device 54 and the text document 56 while simultaneously obtaining multiple laterally-displaced digital images of the text document. Next, as illustrated by FIG. 5, the claimed system automatically determines fractional pixel offset positions at which each digital image was obtained. An enhanced resolution representation of the original text document segment is then generated from the multiple laterally displaced images as a function of the fractional pixel offset positions as illustrated by FIG. 6. Finally, the claimed system de-blurs the enhanced resolution representation of the text document segment.

c. Subject Matter of Independent Claim 20:

Claim 20 depends from independent claim 13, and includes the limitations of claim 13, as summarized above, which are incorporated herein by this reference. In addition,

claim 20 includes further limitations which explain that the claimed de-blurring of the enhanced resolution representation of the text document includes conforming the enhanced resolution representation to only two image levels as a function of first and second thresholds, as illustrated by thresholds T_{w1} and T_{b1} in FIG. 8.

d. Subject Matter of Independent Claim 25:

In general, the subject matter of claim 25 relates to a computer-readable medium having computer executable instructions for capturing and digitizing a segment of a text document in a manner that provides an enhanced resolution digital representation of the original segment of the text document.

In particular, as illustrated by FIG. 2, the claimed computer-readable medium provides computer instructions for controlling a jitter control device 78 to provide a continuous lateral jittering between a digital imaging device 54 and the text document 56. The digital imaging device 54 then obtains multiple laterally-displaced digital images of the text document 56 during the continuous lateral jittering of the digital imaging device. Further, these multiple laterally-displaced digital images are obtained at a plurality fractional pixel offset positions, which are not predetermined, relative to an original position of the text document 56 relative to the digital imaging device 54. Next, since the aforementioned fractional pixel offset positions are not predetermined, the claimed computer instructions automatically determine the fractional pixel offset positions at which each digital image was obtained. An enhanced resolution representation of the original text document is then generated from the multiple laterally displaced images as a function of the computed fractional pixel offset positions as illustrated by FIG. 6. Finally, the claimed computer instructions act to de-blur the enhanced resolution representation of the captured segment of the text document.

e. Subject Matter of Independent Claim 33:

In general, the subject matter of claim 1 relates to a method for capturing and digitizing a spatially piecewise constant image in a manner that provides an enhanced resolution digital representation of the original segment of the spatially piecewise constant image. Note that the term "spatially piecewise constant image" is defined in paragraph [0083] of the Appellant's published patent application (United States Patent Application 20030063814) image regions that primarily include monochrome foreground images on a monochrome background, such as, for example, "monochrome text on a monochrome background."

In particular, as illustrated by FIG. 2, the claimed method uses a jitter control device 78 imparts a continuous lateral jittering between a digital imaging device 54 and the spatially piecewise constant image 56. The digital imaging device 54 then obtains multiple laterally-displaced digital images of the spatially piecewise constant image 56 during the continuous lateral jittering of the spatially piecewise constant image. Next, as illustrated by FIG. 5, the claimed method automatically determines fractional pixel offset distances representing pixel capture positions at which each digital image was obtained. An enhanced resolution representation of the original spatially piecewise constant image is then generated from the multiple laterally displaced images as a function of the computed fractional pixel offset positions as illustrated by FIG. 6. Finally, the claimed method acts to de-blur the enhanced resolution representation of the spatially piecewise constant image.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

a. Claim 20 was rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellant regards as the invention. The rejection of claim 20 is appealed.

b. Independent claim 1 was rejected under 35 U.S.C. §103(a) as being unpatentable over Crinon, et al. (U.S. Patent 6,285,804, hereinafter "***Crinon***"), in view of

Steinkirchner (U.S. Patent 5,392,365, "***Steinkirchner***"). The rejection of claim 1 is appealed.

c. Independent claim 13 was rejected under 35 U.S.C. §103(a) as being unpatentable over ***Crinon*** in view of ***Steinkirchner***. The rejection of claim 13 is appealed.

d. Independent claim 25 was rejected under 35 U.S.C. §103(a) as being unpatentable over ***Crinon*** in view of ***Steinkirchner***. The rejection of claim 25 is appealed.

e. Independent claim 33 was rejected under 35 U.S.C. §103(a) as being unpatentable over ***Crinon*** in view of ***Steinkirchner***. The rejection of claim 33 is appealed.

VII. ARGUMENT

The following arguments present the rationale for the patentability of independent claims 1, 27 and 45. In addition, the following arguments present the rationale for the definiteness of claim 20 (under 35 U.S.C. §112, second paragraph). The separate rejections of the remaining dependent claims are not argued separately, as it is believed that the patentability of their respective independent parent claims negates the separate rejections advanced with respect to the various dependent claims.

a. Rejection of Claim 20 under 35 U.S.C. §112:

The Office Action of June 7, 2005 rejected claim 20 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellant regards as the invention. In particular, the Office Action characterizes claim 20 by suggesting:

> "The Applicant states that an image is divided into two image levels, an operation along these lines would require one threshold value. Using two threshold values would result in an image divided into three image levels. So

> when the applicant states "as a function of first and second thresholds" the examiner interprets this statement to mean that two threshold holds are set which means three image levels. However, the section immediately preceding the quotation states that the image is divided into two image levels. Therefore claim 20 contradicts itself. The examiner has taken claim 20 to mean that an image is thresholded into two levels, as this seems to be the action performed in the rest of the claims."

In contrast to the position advanced by the Office Action, the Appellant respectfully suggests that the Examiner is misinterpreting the claimed language and reading the claim in a manner that is ***clearly inconsistent*** with the detailed description of the specification, and also ***inconsistent with the express language*** of claim 20. In particular, as described in paragraphs [0060] through [0066] of the Appellant's published patent application (United States Patent Application 20030063814):

> "[0060] In an exemplary implementation having a VGA-resolution sensor and a U.S. letter-size (or A4-size) text document, each digital camera pixel covers roughly {fraction (1/72)} inch (0.054 mm) square which is larger than the stroke width for most 9 point fonts. ***De-blurring method 130*** can provide accurate classification of enhanced resolution pixels despite such constraints.
>
> [0061] Process block 132 indicates that a binary image W is formed of locations that are within a ***threshold*** T_{w1} of being a background level (e.g., white).
>
> [0062] Process block 134 indicates that a binary image B is formed of locations that are within a ***threshold*** T_{b1} of being a foreground level (e.g., black).

> [0063] Process block 136 indicates that ***the binary images W and B*** are filtered by a blur function b having the same dimension as the sensor averaging area (e.g., approximately the pixel pitch or width p). The filtering of the binary images W and B may be represented as W*b, and B*b, with b being the VGA blur function at the enhanced or target resolution. The filtering may be characterized by the following propositions:
>
> [0064] A gray pixel that is within p of a white pixel can not be black
>
> [0065] A gray pixel that is within p of a black pixel can not be white.
>
> [0066] These propositions are based upon the averaging nature of the digital camera sensors, which blur white to black transitions by 2p."

Appellant respectfully suggests that claim 20 does ***not*** "contradict itself" as suggested by the Office Action. In particular, in light of the above cited text, it is clear that, as claimed, "de-blurring the enhanced resolution representation of the text document includes ***conforming the enhanced resolution representation to only two image levels as a function of first and second thresholds***", specifically ***threshold*** T_{w1} and ***threshold*** T_{b1}. As explained in paragraphs [0061] and [0062], these thresholds are used to conform the text document to one of two binary images, image "B", as a function of ***threshold*** T_{b1}, and image "W" as a function of ***threshold*** T_{w1}. This concept is clearly claimed using unambiguous language which simply recites "***conforming the enhanced resolution representation to only <u>two image levels as a function of first and second thresholds</u>***." Thus, the interpretation offered by the Examiner is clearly in error. Consequently, it should be clear that not only does claim 20 ***not*** contradict itself, but it is also ***fully consistent*** with the specification.

Therefore, in view of the preceding discussion, the Appellant respectfully traverses the rejection of claim 20 under 35 U.S.C. §112, second paragraph, and respectfully

requests reconsideration of the rejection of claim 20 under 35 U.S.C. §112, second paragraph.

b. Rejection of Independent Claim 1 under 35 U.S.C. §103(a):

Independent claim 1 was rejected under 35 U.S.C. §103(a) based on the rationale that the ***Crinon*** reference discloses the elements of the Appellant's claimed "text document capture method" with the exception of "possible items that could be imaged" by the ***Crinon*** technique, or "or post imaging processing." The Office Action then offers the ***Steinkirchner*** reference as disclosing thresholding two tone images into two colors and post processing of text documents, and suggests that combining the post processing techniques offered by ***Steinkirchner*** with the resolution enhancement techniques offered by the ***Crinon*** reference discloses the Appellant's claimed invention.

However, in contrast to the position advanced by the Office Action, the Appellant respectfully suggests that the ***Crinon*** does not disclose the Appellant's claimed invention when combined with the ***Steinkirchner*** reference, and that, if fact, the Office Action has incorrectly interpreted the ***Crinon*** reference in an attempt to show an equivalency to particular elements of the Appellant's claimed invention.

In particular, the Office Action offers co. 5, line 28 to col. 6, line 3 of the ***Crinon*** reference as teaching "forming from the multiple laterally displaced images an enhanced resolution representation of the text document as a function of the fractional pixel offset positions," as disclosed and claimed by the Appellant.

However, as explained by ***Crinon*** in 3, lines 41 to col. 4, line 35, the parameters of a "global motion model" are estimated by estimating motion models ***between a reference image and every other image*** in a set of *N* low resolution images. This global motion model is then used to derive "motion vectors" for every pixel in the set of low resolution images relative to the "reference image", with the ***motion vectors then being used to map*** high resolution grid points onto the low resolution images to form a set of mapped

"inter-pixel positions" on each low resolution image. Then, one or more "low-resolution pixels" from each low resolution image having a "closest spatial distance" to the "inter-pixel positions" are identified. Next, one or more of these identified "low-resolution pixels" having a "shortest distance" relative to the "high-resolution grid points" are selected, and the intensity values of those selected "low-resolution" pixels are mapped into the corresponding "high-resolution grid points." Note that this process is also explained in claims 1 and 9 of the ***Crinon*** reference.

In stark contrast, unlike the ***Crinon*** reference, rather than computing global motion models, deriving motion vectors from the motion model for relating a reference image to every other image, mapping image pixels to "inter-pixel positions" which are in turn used to map pixel intensities to "high-resolution grid points," the Appellant simply computes enhanced resolution images as ***a direct function of the fractional pixel offset positions***, as described and claimed.

For example, as described by the Appellant in paragraph [0048]:

> "[0048] ***One implementation of determining each enhanced resolution pixel employs a weighted combination of multiple (e.g., 3) image pixel samples that are nearest the enhanced resolution pixel***. As shown in FIG. 6, the value PE of an enhanced resolution pixel 110 may be ***calculated as a weighted sum of the image values S_A, S_B, and S_C of the three nearest image pixel samples*** 112A, 112B, and 112C:
>
> $$P_E=W_AS_A+W_BS_B+W_CS_C$$ "

Clearly, the process for generation of high resolution images that is described and claimed by the Appellant is vastly less complicated than the process described and claimed in the ***Crinon*** reference. Further, it appears that the only commonality between the two methods is that both methods make use of a plurality of images having potential offsets measured in fractional pixel distances. Consequently, it can not be fairly stated that

the ***Crinon*** reference in any way discloses the Appellant's claimed system for "forming from the multiple laterally displaced images an enhanced resolution representation of the text document ***as a function of the fractional pixel offset positions***." Further, the Appellant respectfully suggests that broadening the interpretation of the language of claim 1 to encompass the teachings of the ***Crinon*** reference are clearly unreasonable in light of the clear discussion of both the Appellant's specification and the discussion provided in the ***Crinon*** reference.

Thus, it is clear that the present invention, as claimed by independent claim 1 includes elements not taught in the proposed ***Crinon*** - ***Steinkirchner*** combination reference. Consequently, the rejection of independent claim 1, and thus of dependent claims 2-8 and 11-12, under 35 U.S.C. §103(a) is not proper. Therefore, the Appellant respectfully requests traverses the rejection of claims 1-8 and 11-12 under 35 U.S.C. §103(a) in view of the novel language of claim 1, and respectfully requests reconsideration of the rejection of those claims. In particular, claim 1 recites the following novel language:

> "A text document capture method for digitizing a text document segment in printed form, comprising:
>
> imparting a ***continuous lateral jittering*** between a digital imaging device and the text document;
>
> obtaining multiple laterally-displaced digital images of all of the text document segment ***during the continuous lateral jittering and determining fractional pixel offset positions at which each image was obtained***;
>
> forming from the multiple laterally displaced images an enhanced resolution representation of the text document ***as a function of the fractional pixel offset positions***; and
>
> de-blurring the enhanced resolution representation of the text document ***by thresholding the enhanced resolution representation into either one of two pixel luminance levels***, representing foreground and

background pixels, with the foreground pixels corresponding to text in the text document." (emphasis added)

c. **Rejection of Independent Claim 13 under 35 U.S.C. §103(a):**

In general, the Final Office Action rejected independent claim 13 under 35 U.S.C. §103(a) over the proposed ***Crinon*** - ***Steinkirchner*** combination reference using virtually the same rationale as discussed above with respect to the rejection of claim 1. However, independent claim 13 includes limitations similar in scope to the limitations of claim 1, as discussed above. Consequently, rather than repeating the detailed arguments presented above with respect to the rejection of claim 1, those arguments are incorporated by reference into the arguments for the patentability of claim 13.

In particular, similar to independent claim 1, independent claim 13 also recites elements relating to construction of enhanced resolution images "***as a function of the pixel offset positions corresponding to each digital image***." For example claim 13 recites the following language:

> "A text document capture system for digitizing with a digital imaging device a segment of a text document in printed form, comprising:
>
> a jittering mechanism for imparting a ***continuous lateral jittering*** between the text document and the digital imaging device ***while it obtains multiple laterally-displaced digital images*** of all of the text document segment, ***said lateral jittering moving through a distance being on the order of around one pixel***;
>
> ***a pixel offset determination system for determining fractional pixel offset positions at which each digital image was obtained***;
>
> and a processing system for forming an enhanced resolution representation of the text document segment from the multiple laterally displaced images ***as a function of the pixel offset positions***

> ***corresponding to each digital image***, and for de-blurring the enhanced resolution representation." (emphasis added)

As explained above with respect to independent claim 1, the elements recited above are not disclosed or in any way rendered obvious by the proposed ***Crinon*** - ***Steinkirchner*** combination reference. Therefore, because the present invention, as claimed by independent claim 13 includes elements not taught in the proposed ***Crinon*** - ***Steinkirchner*** combination reference, the rejection of independent claim 13, and of dependent claims 14-20, 22, and 23, under 35 U.S.C. §103(a) is not proper. Therefore, the Appellant respectfully traverses the rejection of claims 13-20, 22, and 23 under 35 U.S.C. §103(a) in view of the novel language of claim 13, as cited above, and respectfully requests reconsideration of the rejection of those claims.

d. <u>Rejection of Independent Claim 25 under 35 U.S.C. §103(a):</u>

In general, the Office Action rejected independent claim 25 under 35 U.S.C. §103(a) over the proposed ***Crinon*** - ***Steinkirchner*** combination reference using the same rationale as discussed above with respect to the rejection of claims 1 and 13. However, independent claim 25 includes limitations similar in scope to the limitations of claim 1 and claim 13, as discussed above. Consequently, rather than repeating the detailed arguments presented above with respect to the rejection of claim 1, those arguments are incorporated by reference into the arguments for the patentability of claim 25.

In particular, as with independent claim 1, independent claim 25 also recites elements relating to construction of enhanced resolution images "***as a function of the fractional pixel offsets***." For example, claim 25 recites the following language:

> "In a computer-readable medium, text document capture software for digitizing with a digital imaging device a text document segment in printed form, comprising:

software for imparting controlled ***continuous lateral jittering between the text document and the digital imaging device***;

software for obtaining multiple laterally-displaced digital images of all of the text document segment ***at a plurality of non-predetermined fractional pixel offsets*** relative to an original position of the text document relative to the digital imaging device;

software for ***determining the fractional pixel offsets of each digital image***;

software for forming an enhanced resolution representation of the text document segment from the multiple laterally displaced images ***as a function of the fractional pixel offsets***; and

software for de-blurring the enhanced resolution representation." (emphasis added)

As with claims 1 and 13, the elements recited above are not disclosed or in any way rendered obvious by the proposed ***Crinon*** - ***Steinkirchner*** combination reference. Therefore, because the present invention, as claimed by independent claim 25 includes elements not taught in the proposed ***Crinon*** - ***Steinkirchner*** combination reference, the rejection of independent claim 25, and of dependent claims 26-29 and 31-32, under 35 U.S.C. §103(a) is not proper. Therefore, the Appellant respectfully traverses the rejection of claims 25-29 and 31-32, under 35 U.S.C. §103(a) in view of the novel language of claim 25, as cited above, and respectfully requests reconsideration of the rejection of those claims.

e. <u>Rejection of Independent Claim 33 under 35 U.S.C. §103(a):</u>

In general, the Office Action rejected independent claim 33 under 35 U.S.C. §103(a) over the proposed ***Crinon*** - ***Steinkirchner*** combination reference using the same rationale as discussed above with respect to the rejection of claims 1 and 13. However, independent claim 33 includes limitations similar in scope to the limitations of claim 1 and claim 13, as discussed above. Consequently, rather than repeating the detailed

arguments presented above with respect to the rejection of claim 1, those arguments are incorporated by reference into the arguments for the patentability of claim 33.

In particular, independent claim 33 includes elements relating to "forming... an enhanced resolution representation... ***as a function of the computed fractional pixel offset distances***." For example, claim 25 recites the following language:

> "An image capture method for digitizing a spatially piecewise constant image, comprising:
>
> imparting a ***continuous lateral jittering between a digital imaging device and the spatially piecewise constant image***;
>
> obtaining multiple laterally-displaced digital images of all of the spatially piecewise constant image ***during the continuous later jittering***;
>
> ***computing a fractional pixel offset distance representing a pixel capture position for each digital image***;
>
> forming from the multiple laterally displaced images an enhanced resolution representation of the spatially piecewise constant image ***as a function of the computed fractional pixel offset distances***; and
>
> de-blurring the enhanced resolution representation of the spatially piecewise constant image." (emphasis added)

As with claims 1 and 13, the elements recited above are not disclosed or in any way rendered obvious by the proposed ***Crinon*** - ***Steinkirchner*** combination reference. Therefore, because the present invention, as claimed by independent claim 33 includes elements not taught in the proposed ***Crinon*** - ***Steinkirchner*** combination reference, the rejection of independent claim 33 under 35 U.S.C. §103(a) is not proper. Therefore, the Appellant respectfully traverses the rejection of claim 33 under 35 U.S.C. §103(a) in view of the novel language of claim 33, as cited above, and respectfully requests reconsideration of the rejection of those claims.

VIII. CLAIMS APPENDIX

The claims listed below provide a complete copy of all claims involved in the Appeal:

Listing of Claims:

Claim 1 (Previously Presented). A text document capture method for digitizing a text document segment in printed form, comprising:

imparting a continuous lateral jittering between a digital imaging device and the text document;

obtaining multiple laterally-displaced digital images of all of the text document segment during the continuous lateral jittering and determining fractional pixel offset positions at which each image was obtained;

forming from the multiple laterally displaced images an enhanced resolution representation of the text document as a function of the fractional pixel offset positions; and

de-blurring the enhanced resolution representation of the text document by thresholding the enhanced resolution representation into either one of two pixel luminance levels, representing foreground and background pixels, with the foreground pixels corresponding to text in the text document.

Claim 2 (Original). The method of claim 1 in which the lateral jittering between the digital imaging device and the text document is imparted in a pair of transverse directions.

Claim 3 (Original). The method of claim 2 in which the transverse directions are generally perpendicular to each other.

Claim 4 (Original). The method of claim 2 in which the lateral jittering is imparted simultaneously in the pair of transverse directions.

Claim 5 (Original). The method of claim 1 in which the lateral jittering is cyclic.

Claim 6 (Original). The method of claim 1 in which the digital imaging device includes an array of optical detectors corresponding to pixels and having pixel dimensions and the jittering moves the digital imaging device by about the pixel dimensions.

Claim 7 (Original). The method of claim 1 in which the text document segment is substantially all of the text document.

Claim 8 (Original). The method of claim 1 in which the forming the enhanced resolution representation of the text document includes calculating weighted sums from the multiple laterally displaced images.

Claims 9-10 (Cancelled).

Claim 11 (Previously Presented). The method of claim 1 in which de-blurring the enhanced resolution representation of the text document further includes applying a blur filter to the enhanced resolution representation.

Claim 12 (Original). The method of claim 11 in which the digital imaging device includes an array of optical detectors corresponding to pixels and having pixel dimensions and in which the blur filter has a filter dimension corresponding to one of the pixel dimensions.

Claim 13 (Previously Presented). A text document capture system for digitizing with a digital imaging device a segment of a text document in printed form, comprising:

a jittering mechanism for imparting a continuous lateral jittering between the text document and the digital imaging device while it obtains multiple laterally-displaced digital images of all of the text document segment, said lateral jittering moving through a distance being on the order of around one pixel;

a pixel offset determination system for determining fractional pixel offset positions at which each digital image was obtained;

and a processing system for forming an enhanced resolution representation of the text document segment from the multiple laterally displaced images as a function of the pixel offset positions corresponding to each digital image, and for de-blurring the enhanced resolution representation.

Claim 14 (Original). The system of claim 13 in which the jittering mechanism includes oscillators with transverse orientations for imparting cyclic lateral jittering in transverse directions between the text document and the digital imaging device.

Claim 15 (Original). The system of claim 14 in which the oscillators include piezo-electric oscillators.

Claim 16 (Original). The system of claim 13 in which the jittering mechanism imparts lateral jittering on the digital imaging device.

Claim 17 (Original). The system of claim 13 in which in which the digital imaging device includes an array of optical detectors corresponding pixels and having pixel dimensions and the jittering mechanism moves the digital imaging device by about the pixel dimensions.

Claim 18 (Original). The system of claim 13 in which the text document segment is substantially all of the text document.

Claim 19 (Original). The system of claim 13 in which the processing system includes a computer that executes software instructions to form the enhanced resolution representation of the text document segment and to de-blur the enhanced resolution representation.

Claim 20 (Previously Presented). The system of claim 13 in which de-blurring the enhanced resolution representation of the text document includes conforming the

enhanced resolution representation to only two image levels as a function of first and second thresholds.

Claim 21 (Cancelled).

Claim 22 (Original). The system of claim 20 in which de-blurring the enhanced resolution representation of the text document includes applying a blur filter to the enhanced resolution representation.

Claim 23 (Original). The system of claim 22 in which the digital imaging device includes an array of optical detectors corresponding to pixels and having pixel dimensions and in which the blur filter has a filter dimension corresponding to one of the pixel dimensions.

Claim 24 (Original). The system of claim 13 further comprising a jitter calibration target of which a digital image is obtained by the digital imaging device for calibrating the extent of jittering imparted by the jittering mechanism.

Claim 25 (Previously Presented). In a computer-readable medium, text document capture software for digitizing with a digital imaging device a text document segment in printed form, comprising:

software for imparting controlled continuous lateral jittering between the text document and the digital imaging device;

software for obtaining multiple laterally-displaced digital images of all of the text document segment at a plurality of non-predetermined fractional pixel offsets relative to an original position of the text document relative to the digital imaging device;

software for determining the fractional pixel offsets of each digital image;

software for forming an enhanced resolution representation of the text document segment from the multiple laterally displaced images as a function of the fractional pixel offsets; and

software for de-blurring the enhanced resolution representation.

Claim 26 (Original). The medium of claim 25 in which the lateral jittering between the digital imaging device and the text document is imparted in a pair of transverse directions.

Claim 27 (Original). The medium of claim 25 in which the digital imaging device includes an array of optical detectors corresponding to pixels and having pixel dimensions and the jittering moves the digital imaging device by about the pixel dimensions.

Claim 28 (Original). The medium of claim 25 in which the software for forming the enhanced resolution representation of the text document includes software for calculating weighted sums from the multiple laterally displaced images.

Claim 29 (Original). The medium of claim 25 in which the software for de-blurring the enhanced resolution representation of the text document includes software for conforming the enhanced resolution representation to only two image levels.

Claim 30 (Cancelled).

Claim 31 (Original). The medium of claim 29 in which the software for de-blurring the enhanced resolution representation of the text document includes software for applying a blur filter to the enhanced resolution representation.

Claim 32 (Original). The medium of claim 31 in which the digital imaging device includes an array of optical detectors corresponding to pixels and having pixel dimensions and in which the blur filter has a filter dimension corresponding to one of the pixel dimensions.

Claim 33 (Previously Presented). An image capture method for digitizing a spatially piecewise constant image, comprising:

imparting a continuous lateral jittering between a digital imaging device and the spatially piecewise constant image;

obtaining multiple laterally-displaced digital images of all of the spatially piecewise constant image during the continuous later jittering;

computing a fractional pixel offset distance representing a pixel capture position for each digital image;

forming from the multiple laterally displaced images an enhanced resolution representation of the spatially piecewise constant image as a function of the computed fractional pixel offset distances; and

de-blurring the enhanced resolution representation of the spatially piecewise constant image.

IX. EVIDENCE APPENDIX

NONE

X. RELATED PROCEEDINGS APPENDIX

NONE

Respectfully submitted,

Mark Watson

Lyon & Harr
300 Esplanade Drive, Suite 800
Oxnard, California 93036
(805) 278-8855

Mark A. Watson
Registration No. 41,370
Attorney for Appellant